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EVALUATION INDICATES GOOD RESULTS FOR PROJECT "SACI"

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Editor

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16. Abstract

An evaluation is given of the results of project SACI, performed by teams of pedagogues and educaitonal program producers. The results are described, and it is concluded that satisfactory results were obtained.

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EVALUATION INDICATES GOOD RESULTS FOR PROJECT "SACI"*

The first evaluation of the results of project SACI, performed by teams of pedagogues and educational program producers, showed quite satisfactory results, both with respect to learning and programming acceptance. /4**

According to José Luiz Warren Jardim Gomes Braga, project SACI manager, in general the program is operating as planned initially, except in some details, in which minor adjustments became necessary. The objectives are meanwhile being achieved. For instance, one of the main objectives was to study programmed learning efficiency; an evaluation performed in 1973 showed net gains in various aspects. Attitudes were in general very positive, Luiz Braga said, in spite of the seriousness of the problem of entering a region that had never had access to television, in schools operating in a traditional, rigid framework. Production personnel, pedagogues and material development personnel went to Rio Grande do Norte in groups of four, to visit the schools that participate in the program, in order to perform specific studies. Thus, one group determined the students' attitude towards TV, another towards radio and one even studied their acceptance of the juvenile characters.

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* Translator's Note: Expansion unknown. From Actualidades do Instituto de Pesquisas Espaciais (Space Research Institute News), Vol. 3, No. 15, March/April 1974, Special Issue, pp. 4-7.

** Numbers in the margin indicate pagination of the original foreign text.

The learning evaluation was carried out even more systematically. The teachers participating in the training program completed several tests, and prepared monthly reports starting in July, 1973. This made it possible to verify several aspects: in the initial phase, classes presented traditionally were well received, such as sciences, a discipline in which classes were given only by the teacher's oral presentation. Portuguese is a discipline that had already been presented under various formats, i.e., different modes of presentation, changing from a novel centered structure to short stories, etc. Acceptance of traditional formats is of course quite natural, considering that the majority of students had had no contact with television, not even commercial.

But, José Luiz Braga explains, soon even the most imaginative programs became accepted. A mathematical program, for instance, was based on two things: one, a quite imaginative scheme, was called "The magic world of mathematics" and involved a typical magic lamp geni, explaining to a group of students exchanging ideas. Another way of making the classroom more pleasant was the use of the table top, which turned out to be very useful in mathematics classes. Soon acceptance of these formats increased.

In terms of learning, there practically was no difference from one subject to another and success was at the expected satisfactory level. In the first year, the success was not what one would call extraordinary, José Luiz Braga says, but it was not expected, either, considering the elementary teacher's level, for whom an isolated TV presents several difficulties.

"The course we put on the air two months after the start of programming for the teachers -- the course for children -- is what we really could call an innovation," José Luiz comments.

"It is at least of national level, in spite of the fact that our resources are much more modest than those of the tele-education centers in this country," he continues,"because we compensate for that deficiency with the personnel's effort." Another factor that limits the possibilities is time, the shortage of which is at times reflected in the production per se (images, for instance), in possible programming failures and in the selection of resources used.

SACI's strong point, he feels, is in innovations in terms of program format. In 1974, SACI is profiting in its children's programming, from what was learned with modular formats; a quite superior product is anticipated, with all the deficiencies observed in the evaluation being corrected.

Results

About the visits of INPE (Instituto de Pesquisas Espaciais = Space Research Institute) teams to Rio Grande do Norte schools, José Luiz Braga says:"Before those groups went into the Northeast, they only had indirect contact with reality, since most of them were not from that area. Thus, there was a tendency toward extreme opinions, with some persons having a very optimistic opinion, and another group doubting the results of this work. At the end of the visit, an approximately mid-way opinion emerged.

And this is very important, because there is a tendency to believe that IBOPE* does not function in terms of education; but acceptance is fundamental. Because if a person is not interested, he will not participate; if he does not participate, he will not learn. It is of course not enough to be interested to learn, but not being interested is already an eliminating condition, and therefore self-motivated interest is one of the high points

* Translator's Note: expansion unknown

of the success in Rio Grande do Norte.

"The other aspect," he continues, "was that of learning, the extent to which the personnel, in its dialogue with the children, confirmed not only that the children were interested and saying they liked it very much, but also that they were referring very clearly to characters and information transmitted in the programs. They remembered, and indicated their preferences by what they had learned best. If a child can remember a program aired months before, this means that the retention level was very good. For this reason the personnel returned feeling very stimulated."

MENDONCA: HOW INPE IS USING SPACE RESEARCH IN OUR REALITY /6

The significant progress in science and technology brought about by the space programs can also be used to promote development. INPE has been proving this with its projects, which have attracted the interest of ministries and other entities. In this interview, INPE director general Fernando Mendonca explains why the most modern techniques are often the cheapest ones, and talks about the Institute's future projects.

Project SACI has operated so far using transmission from ground stations. To what point is a national educational satellite justified at this time, in case of expansion of the educational TV and radio programs?

Mendonca: The experiment was created to demonstrate the feasibility of using satellites in education. Of course, when we started, five years ago, the major criticism was that "satellites are very nice, it is a modern, expensive technology, and it has never been shown that it can work for education; why are you getting involved in such a project?" The idea is that satellites have never been used in education because initially the cost was very high. This is obvious. But the cost of communications, i.e., the channel minute, is falling rapidly as time passes. And the increasing power of the satellites makes it clear that it will be used for distribution of information to the masses.

But a satellite does not perform miracles; it is only a mirror. If a good message is sent, a good message comes out; if a bad message is sent, a bad message comes out. A project such

as this could not be developed from an engineering point of view because there were doubts regarding the existence in this country of groups with sufficient ability to produce educational programs for the system. Hence, we started with two well defined groups, which are interconnected but deal with quite different matters. One was an engineering group, thinking in terms of number of channels, frequencies, equipment, costs, maintenance, etc. The other group dealt with the formulation of program content. It was therefore a group composed of pedagogues, sociologists, educational psychologists, education economists, etc.

But it is not possible to continue recommending something without an idea about its application in a limited universe. At that point, the Rio Grande do Norte area was selected, and personnel training was started. A proposal for satellite use was submitted to NASA in 1968, for use of the ATS-F, whose characteristics were very similar to those of the satellite we intended as a domestic communications satellite for Brazil. NASA agreed in principle to give us a daily time slot on the ATS-F, and we began getting ready to use this time to carry out our intended demonstration. Naturally this took five years and many thousands of man-hours. Satellite launching was delayed because of contracting difficulties between two companies: one was selected, and the other lodged a legal complaint because it did not accept the judging committee's decision: it won. Then the first company stopped what it was doing and the second one started, and this delayed the program by two years. But the satellite will be launched this year, in the week of April 17. Once launched, it will be several weeks before it is operated, because ATS-D is not only a communications satellite, but also has 19 geophysical experiments on board. And the Americans want to guarantee the geophysical measurements first -- since they justify the satellite's cost -- leaving the communications part for the start of the second semester.

Here is where our difficulties start. Since the program for a Brazilian domestic satellite has not been approved yet, it would be unfair to invest large amounts of money in an experiment that is to last only a year. Due to this, there was some delay in the constraction of the small equipment which will receive the satellite signals directly at the schools, for retransmission to Rio Grande do Norte. These stations will not be ready until approximately July 15. We therefore proposed to NASA that the time-use for this experiment start the last week in July and continue to the end of December, when the schools go on vacation; it would start up again in early February of the following year. This would even make it possible to conduct an evaluation -- during the vacations -- of the technical communications aspect during the first phase, so that they can be corrected for the second.

After this year, that is, by mid-1975, INPE's participation in project SACI must end. It is of course not necessary to carry the experiment to 500 schools: a much smaller number would be sufficient for experimentation. But the project cost is not related to the number of schools: it is related to the production of television programs, which is ten times more expensive than that for radio programs. Thus, since that cost is very high, the marginal cost incurred in increasing the school number from a few tens to 500 was very low. This would also mean a contribution -- even at this experimental stage -- to the State's educational system. Consequently, this experiment reaches about 20% of all students in Rio Grande do Norte.

Well. This means then that INPE's participation must end in a year, or a year and one half. What will happen to the infrastructure mounted in Rio Grande do Norte, and what will INPE's production staff do now?

Mendonca. Of course, after placing nearly 200 persons and having them work for several years, no one expects to end the project in 1975 and lose the most valuable part of the program, namely a trained staff. SACI's largest investment was in personnel training, and hence this staff will be transferred with the program to the State's Department of Education, around the second semester of the coming year. In that manner they can continue through objective eight (this year we are developing objectives three and four).

We will then disengage INPE personnel from those objectives and transfer that team -- trained for the production of project SACI's programs -- to apply educational technology in post-graduate courses. INPE is already a respectable post-graduate school with almost 200 students. We intend to innovate at this level, improving the presentation of the subjects in these courses. Much of the material applicable to children is not suited for post-graduates, but the general methodology is valid. On the other hand, we shall look for new ways.

If the Federal Government were to approve the Brazilian domestic satellite this year, as expected, it is obvious that this committment in the educational area would permeate deeper into the structure of the MEC (Ministerio da Educacão e Cultura = Department of Education and Culture) and we would then be in a position to be of some help, because of our experience in Rio Grande do Norte. There would be sufficient time to form the necessary groups, because, even if aproved this year, launching would not take place until 1977.

Thinking long range, what is INPE's future: would it tend to become a super-university, a kind of storehouse for ideas, or would it tend to grow into some government entity responsible for the

country's technological development, at a Department level?

Mendonca. INPE is not prepared for this, since its jurisdiction is only the space sector. Hence, our responsibility is space research, be it pure, scientific research, or in applications. Many years ago, the choice was made among various available alternatives, and it was found justified to have a space program in a country with as many unmet needs as Brazil, which is rather poor even compared to other latin american countries. The condition was not to engage in any program other than one that would contribute in terms of national development. The areas then chosen were educational communications, natural resources mapping by remote sensors, technology transfer and systems analysis. Once this type of knowledge has been transferred to service organizations in Brazil, we shall look to other areas of space applications, and there are many, many options.

We are only waiting to consolidate previous efforts, which depends on technology absorption by already established organizations. For instance, natural resources is an area of interest of the Departments of Mines and Energy, Agriculture or Interior. The area of educational communications would be in part in the Department of Communications, and in another, in the Department of Education. Systems analysis pertains to the Planning Division being created by the Government, or to the Department of Planning proper. The area of technology transfer must be considered by the Department of Industry and Commerce. Once these functions have met with success -- which means that all of these organizations are involved, providing continuity for the use of these technologies -- we shall identify other opportunities and include them in our programs to make further transfers, which in turn can contribute to national development. For this process, INPE counts on a rather considerable group of researchers. I believe there are very few institutions in this country that have

40 scientific doctors (Ph.D.), approximately 100 masters and some 400 upper level persons, as INPE does. Besides this, we have a monolithic, solid, fairly effective, modern structure.

Considering the importance of all this advanced technology to the country, how would you characterize INPE's role in national development?

Mendonca. INPE is a very small organization: its investment is one thousandth of what is invested in the country. Even within the science and technology area, investment in the basic plan for the two-year period 1973-1974 is of the order of 4.2 billion cruzeiros, of which INPE's part is less than 1.5%. This means that if we are really to have some impact in the science and technology sector, we have to use methods, tools and instruments of such high yield that even a small investment has meaning in terms of national development.

In the case of our remote sensing satellite projects, our disbursements were less than ten million dollars, and benefits are being reaped equivalent to several tens of millions of dollars. But how was this miracle accomplished? There really was no miracle; rich countries spend money on such a satellite. Their satellite programs cost them 300 million dollars and we are using the same satellite with the efficiency of a country that did spend 300 million. The multiplicative effect is there: an agronomist gets a map of Minas Gerais, studies the soil of the entire area, prepares a vegetation map, identifies both natural forests and those due to reforestation, and a whole series of things tens of agronomists could not have accomplished since the beginning of the century.

What is the relationship between NASA and the Brazilian Government in this respect?

Mendonca. I find that there is no country other than Canada whose relationship with the United States is as cordial and as effective as is Brazil's, especially in the area with NASA, through INPE. We have cooperated with them for the last 14 years, and if there was never a transfer of funds, there has always been information transfer, help with personnel training, scholarships and equipment loans. Suffice it to say that there are only two countries that make large scale use of the ERTS-1 satellite: one is Canada, the other Brazil. Although over 20 countries submitted applications, ours were accepted.

At least within project SERE*, then, there is no need to think of a domestic natural resources satellite?

Mendonca. There is and there is not. Also NASA has only experimental programs. It only developed a communications satellite when it became necessary to show that a satellite can provide communications. Once the development reached a point in which the private sector became interested, NASA stopped its communications satellite program, such as ATS-F, which will be the last one.

The remote sensing satellites, first ERTS-1 and when it failed, the second one, are still only two satellites. There will be others, later, possibly even within the Government, but it will probably be the Department of the Interior of the United States that will use them. I would not doubt very much that within the next five or six years -- in the same manner as Comsat and later Intelsat showed -- an international consortium will be formed to perform resources mapping by Government contracts. To amplify

* Translator's Note: Expansion unknown

the comparison with the case of communications, we could say that the Cuiabá station would function with a satellite of that consortium, just as Tanguá station does with the Intelsat satellites.

What would be new areas the INPE coordination could develop once the objectives of the current projects have been accomplished?

Mendonca. We can mention several of many possibilities. Space medicine, for instance. This mode would consist of using all the techniques developed for the medical control of the astronauts, and applying them to the populations of the country's interior regions. An astronaut may be in orbit, but he is being accompanied biophysiologically from all aspects, such as pulse, electroencephalograms, electrocardiograms, basal metabolism, blood analysis, urinalysis, etc. Why not use these techniques on the individual dying in Cucuí, on the Amazonas, so that he can be treated by the best physicians in San Paulo? This is one field open for future studies.

Even within the field of education there are many areas we are not dealing with, such as information, computation, etc., that could be dealt with in the future as the use of these methodologies in education grows. There is a tremendous vacuum in this country in the information sector, not only in the technical scientific field, but also in commerce, industry, etc.

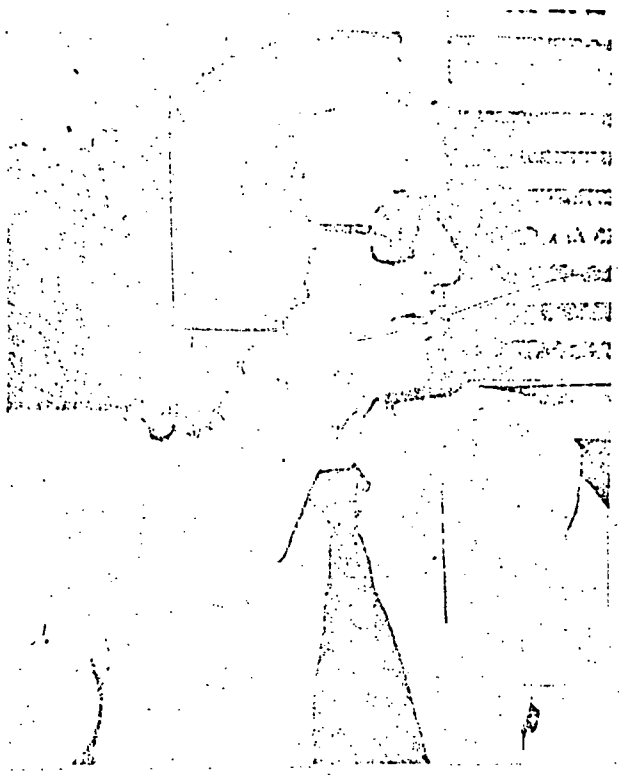
Ideally, at the end of five years each of the coordinated activities at INPE -- natural resources, systems analysis, SACI, basic research, technology transfer -- would become institutes at some Ministry. Imagine, five or so years from now, what is SACI today being used as the embryo for some national institute of educational technology, subordinated to the MEC in terms of

problems, and funded by whatever organism is coordinating research in this country? Or SERE subordinated to the Department of Mines and Energy, or Interior? Systems analysis could go to the Department for Planning. The Government has been alerted to these possibilities; especially with this new Government, facing a new world of problems, this idea could be treated positively, in a future I hope is not too remote.

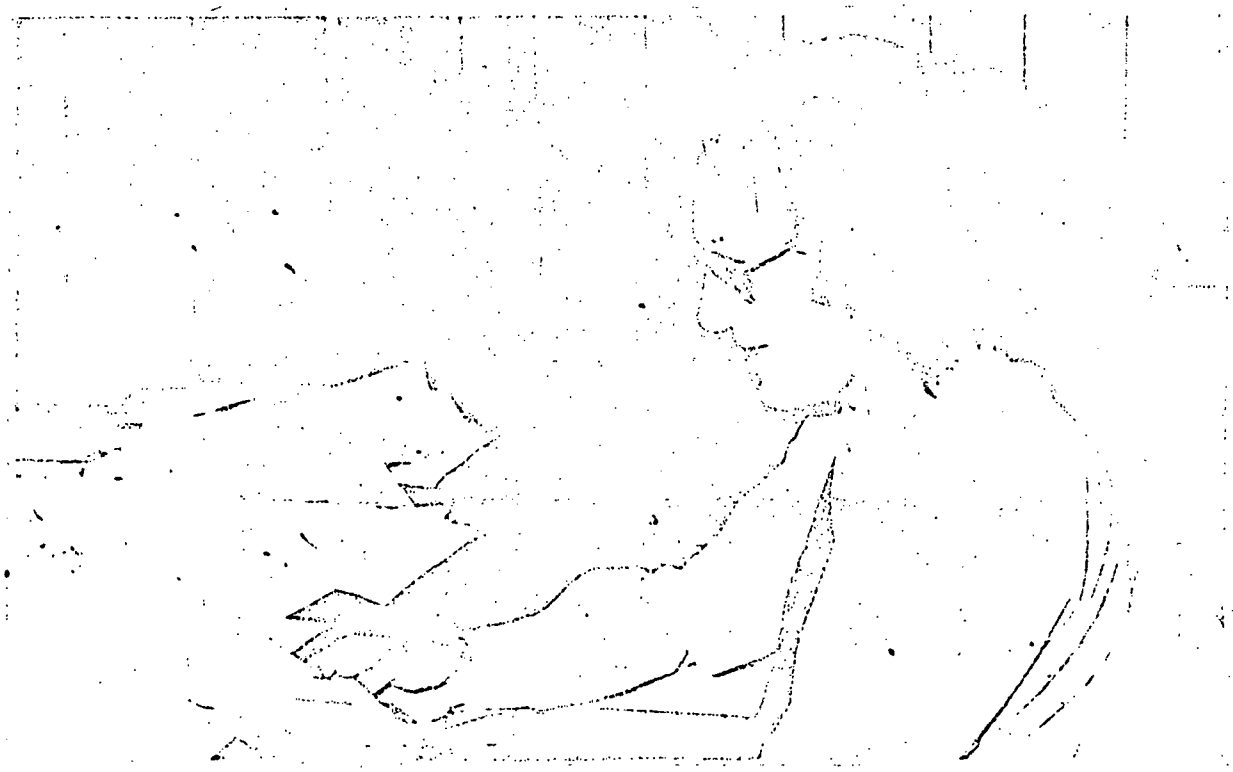
And where would INPE's basic research sector go?

Mendonca. It is impossible to have an organization dedicated exclusively to basic research in this country, because the moment at which it came into being, it would face a number of difficult situations because of the lack of survival factors for pure research in Brazil. With the rare exception of a few universities, most learning institutions in this country do not perform basic research at an adequate level. And scientific research should not be underdeveloped: it is either good, or not good, because science is international. And what should we do, if this country still lacks a program of basic scientific research, if there can't be an institution of purely technological activities, either -- because technology develops very rapidly, and makes anything obsolete in a very short time? The answer is that the only way to develop technology is by giving it scientific backing.

Thus, if I had a group dealing exclusively in space science the initiative would die in seven or eight years, as several organizations in Brazil have died because they only dealt in basic research. At the same time, it would be wrong to concentrate only on technology, because it could not evolve. It is thus necessary to combine the double concept "science and technology" in the same organization.



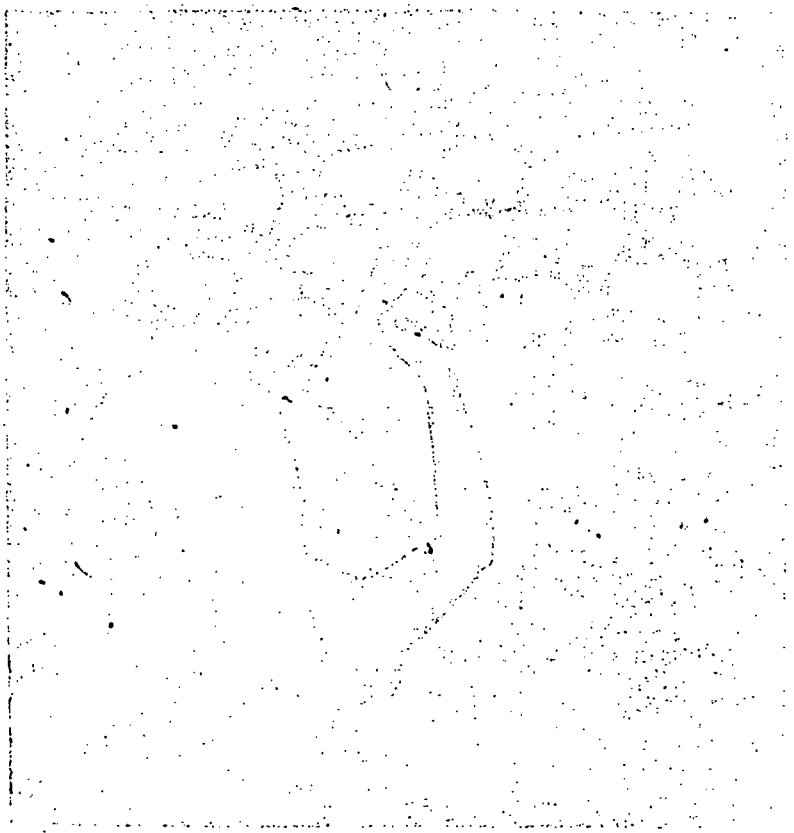
SACI's José Luiz: the acceptance level for the programs was very good



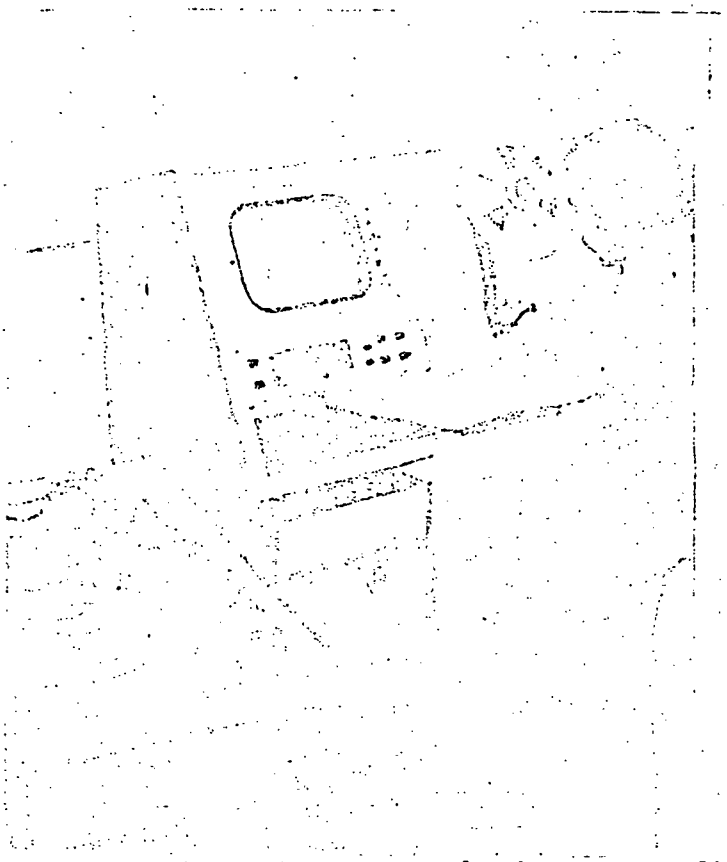
... and the retention level of the material stimulated the production team

Recording of a class in SACI's television studio

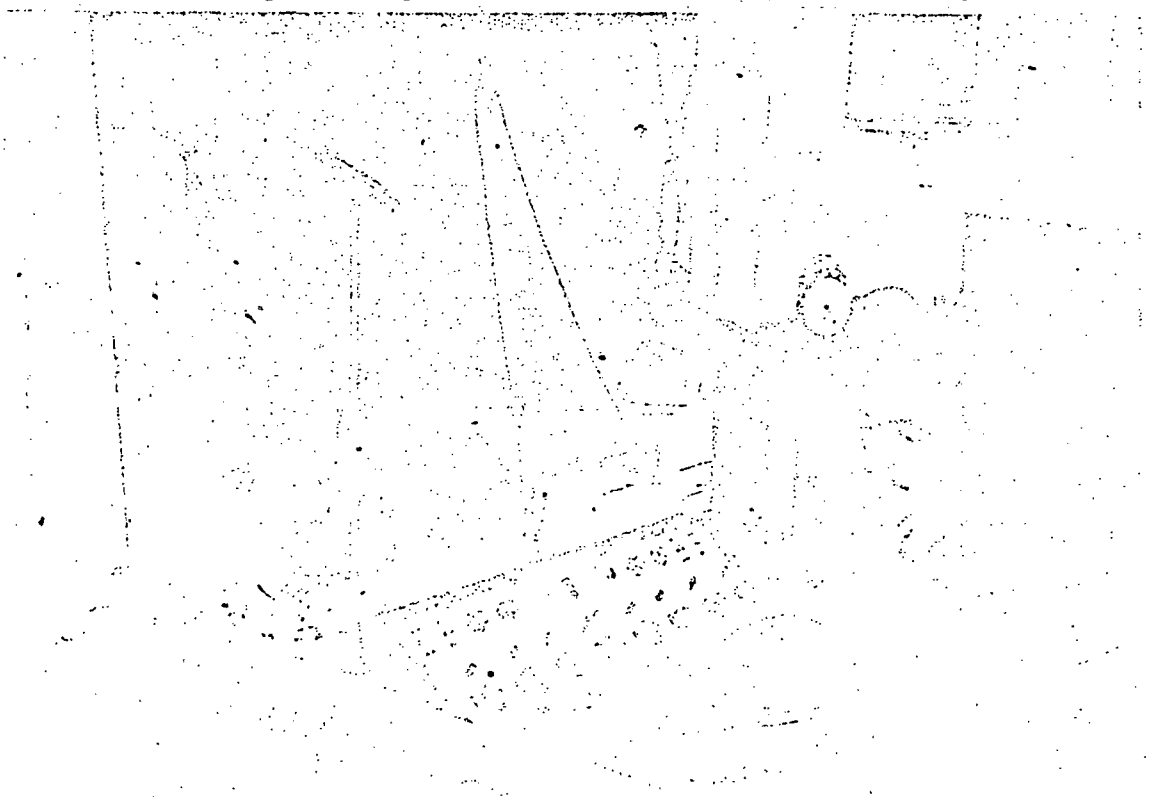
The programs have a national quality level



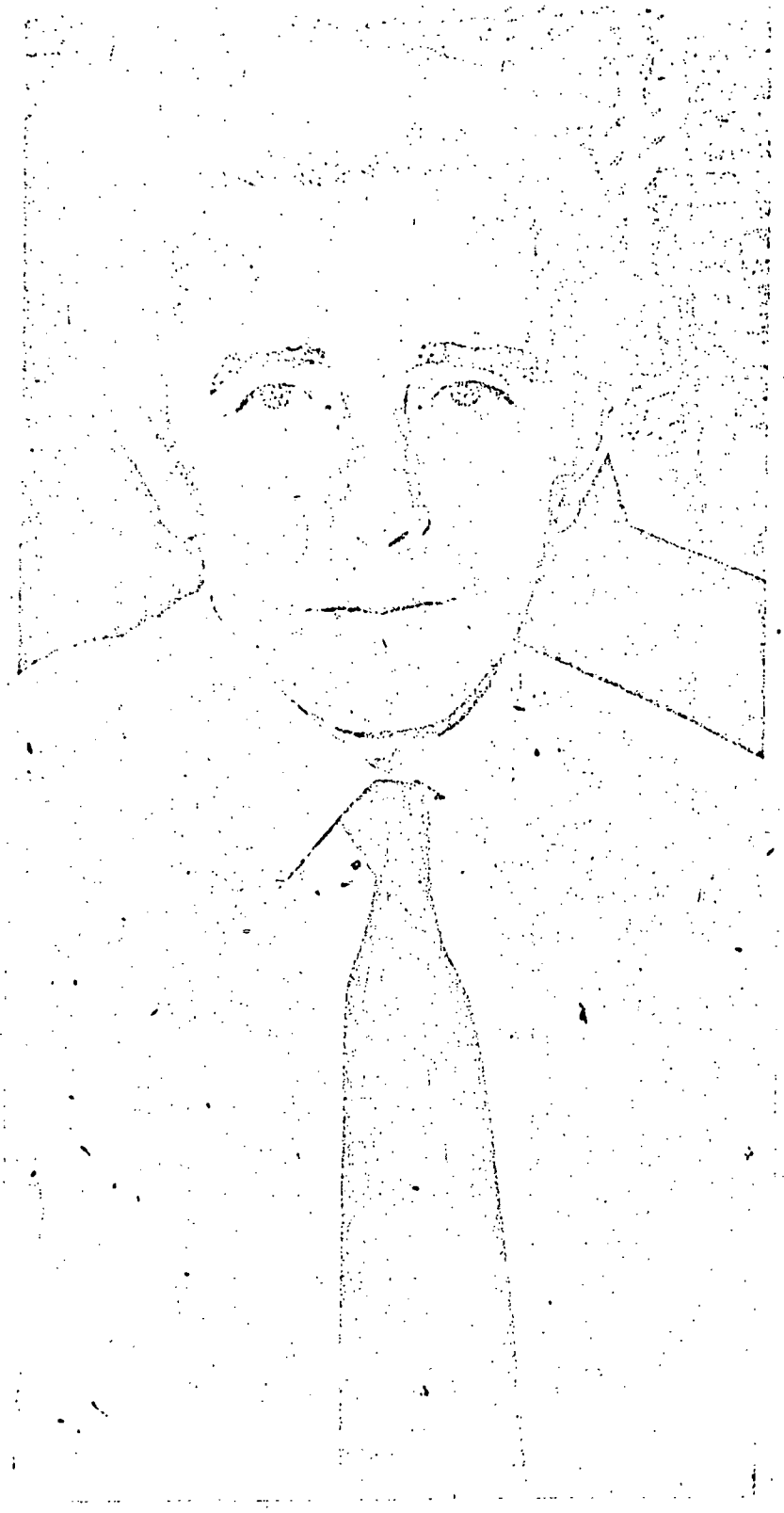
Different resources are used to make the classroom more interesting



Video-tape equipment in use during recording



Classes transmitted by radio are recorded in this studio



Mendonca: investments with multiplicative effect

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